Case assignment in agrammatism

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Chapter 4

Russian agrammatic aphasia

4.1 INTRODUCTION

The production of case morphology in agrammatic aphasia, such as on determiners in German, is related to the production of case-assigning categories, such as verbs and prepositions, as has been demonstrated in Chapters 2 and 3. It has been shown that the omission of one group of function words (i.e. determiners) in agrammatic speech is not a symptom that exists by itself, but is a symptom caused by another symptom - the problems agrammatic aphasic patients have with the production of verbs and prepositions. Of course, not all languages have determiners or free grammatical morphemes that are case-marked, like German[1]. In Russian, for example, case is realized with a bound morpheme on the noun. This chapter aims to describe the case-marking abilities of Russian agrammatic aphasic patients. In order to compare the different languages, part of the German test battery, as described in section 3.4, was adapted to Russian. The chapter starts with a sketch of case and case assignment in Russian. The second section consists of an overview of studies with Russian aphasic patients found in the literature. It is followed by a description of the methods used in the present study. Subsequently, the results are presented. This chapter ends with a discussion of the Russian data in the light of the theories that are presented in Chapter 1 and in this chapter.

4.2 LINGUISTIC BACKGROUND: RUSSIAN

The linguistic background on Russian case and case assignment is presented in the following section (for a general linguistic introduction on case assignment, see section 1.2). Examples of case assignment in Russian that are relevant for this study are given, as well as the case paradigm. Also, the distinction between structural, lexical and inherent case assignment in Russian is discussed. This is followed by some examples of elliptical speech. Finally, some results from a language acquisition study are presented.

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[1] In fact, German is rather exceptional. Most languages with morphological case have case marking as a bound morpheme on the noun (e.g. Russian, Hungarian, Serbo-Croatian, Turkish).

Case marking in Russian

Russian is a language with a relatively free word order and a rich case system compared to, for example, Dutch and English. Case marking on a DP[2] is important for the identification of the grammatical function of that DP. Is it the object or the subject of a sentence? In Russian, DPs may be marked for case, number, person and gender. The case marking is realized as an affix at the end of the noun (see Table 1). The Russian case system consists of six different cases: nominative, genitive, dative, accusative, instrumental and prepositional. Two other cases can be identified, partitive and locative, but these have only limited distinct morphology and are normally identical to genitive and prepositional case respectively. There are four declension classes that differ in the morphological realization of case. The first declension represents mainly feminine nouns, the second represents masculine and neuter nouns, and the third feminine nouns exclusively (Babyonyshev, 1993). Words from the fourth declension class are said to be declensionless (Halle, 1993). This is the declension for all foreign words that cannot be analyzed as one of the other declensions (this declension is not presented here). In Table 1, the Russian case paradigm for nouns is given. Note that sometimes the same case-marking morpheme is used for two (or even more) different cases. Not only nouns, but also adjectives, are case-marked in Russian. This study focuses on the production of nouns, and case marking on nouns, and therefore adjectives will be left aside.

	1st declension		*2nd declension*		*3rd declension*	
	singular	*plural*	*singular*	*plural*	*singular*	*plural*
Nominative	-a	-y	Ø/-o	-y/-i/-a	Ø	-i
Accusative	-u	-y	Ø /-o/-a	-y/-ej/-a	Ø	-I
Dative	-e	-am	-u	-am	-i	-am
Genitive	-y	Ø	-a	-ov/-ej/ Ø	-i	-ej
Instrumental	-oj (u)	-ami	-om	-ami	-ju	-ami
Prepositional	-e	-ax	-e	-ax	-i	-ax

Table 1: The Russian Case Paradigm

[2] I use the notion DP for the Russian noun phrase, following other authors (Babyonyshev, 1993; Avrutin, 1995) to avoid confusion about terminology. There are, however, authors who have argued that not all Russian noun phrases allow for a DP analysis (see Franks, 1995).

Case marking on nouns cannot be omitted in Russian. Production of a noun stem without a case morpheme may result in a non-existing word (see 1). This means that in Russian, abstract case is always realized morphologically.

(1) a. * devochk-
girl (noun stem)
b. devochka
girl-NOM

There are some words, from the second and third declension, that are produced without case marking in nominative and accusative case. For the experiments that are performed with the Russian patients, nouns from the first declension are used as much as possible.

Case assignment in Russian

Nominative and accusative case assignment in Russian is similar to German assignment. Nominative case is assigned structurally to the subject of a sentence in the specifier of AgrS by the finite verb that has moved to AgrS. Accusative case is assigned structurally to the direct object by a transitive verb in AgrO. In (2), for example, the subject *zhenschina*, 'the woman$_{nom}$', receives nominative case from the finite verb *tseluet*, 'kisses', that has been moved to AgrS (cf. GB theory, Chomsky, 1981, 1986). The object *muzhchinu*, 'the man$_{acc}$', is assigned accusative case in the specifier of AgrO by the verb *tseluet* that has been moved to AgrO.

(2) zhenschina tseluet muzhchinu

NOM ACC
woman-NOM kisses man-ACC
'the woman kisses the man'

In Russian, some verbs do not assign case structurally to the object of the sentence, but lexically. Which case has to be assigned to an object is specified in the lexicon. In (3) the verb *pomogaet*, 'helps', assigns dative case lexically to the object of the sentence *muzhchine*, 'the man$_{dat}$'. The subject *zhenschina*, 'the woman$_{nom}$', is assigned nominative case structurally by the finite verb *pomogaet*, 'helps'.

(3) zhenschina pomogaet muzhchine

NOM DAT

woman-NOM helps man-DAT

'the woman helps the man'

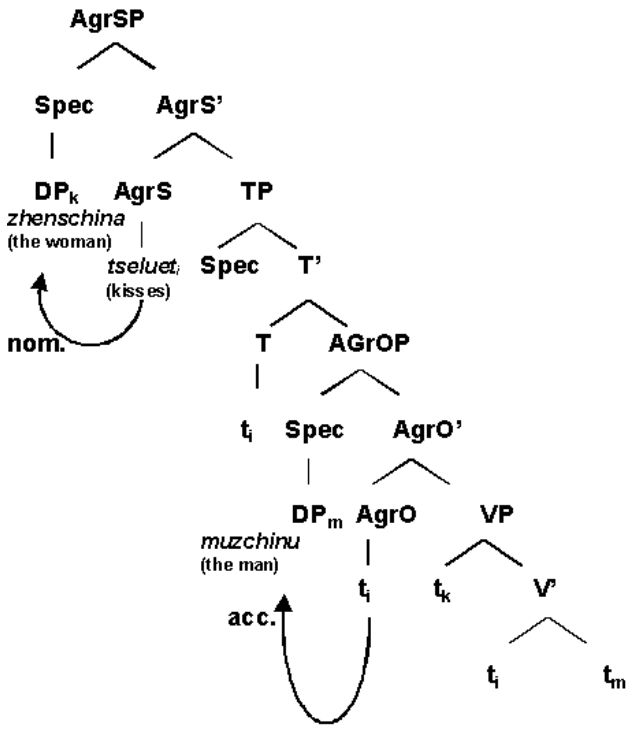


Figure 1: Case assignment in Russian

Thus, case assignment in Russian can be both *structural*, in the appropriate syntactic configuration, and *lexical*. Structural case is assigned to a DP based on its structural position (as in 2). Lexical case is assumed to be specified in the lexical entry of a case assigner (cf. Haider, 1985 for German). This means that particular lexical items may impose irregular case requirements on their objects. Case assignment can also be *inherent*, which neither depends on syntactic configuration nor on a specific lexical case assigning item. It is assumed to depend on thematic interpretation (see also Dürscheid (1999) on inherent case assignment to adjuncts in German).

For Russian, nominative and accusative case are usually analyzed as structural cases. Accusative case, however, is not always considered to be structural case. When

accusative case is assigned by a preposition, it is assumed to be lexical case (see e.g. Babyonyshev, 1993, but see Franks, 1995). Nominative case can only be assigned structurally.

The special status of genitive case in Russian

Genitive case is assigned as a complement of nominal elements, such as nouns and quantifiers. This is also analyzed as structural case assignment, since it can be overridden by lexical case assignment. The heads of quantified phrases have genitive case. That is, quantified phrases are assigned genitive case (see 4a and b) in a position that would normally get structural case (i.e. nominative in subject and accusative case in object position).

(4) a. Pjat' malčikov prišli.
five-NOM boys-GEN came.
b. Ja čitala pjat knig.
I-NOM read five-ACC books-GEN.

In (4a), the subject, *pjat' malčikov*, 'five $boys_{gen}$', receives genitive case *structurally*, since it is quantified. In the same way, the object, *pjat'knig*, 'five $books_{gen}$', in (4b) receives genitive case *structurally*, because of the quantifier. When the quantified phrase is assigned lexical instead of structural case, then both the quantifier and the noun modified by this quantifier receive that lexical case, instead of genitive case. This is shown in (5), where the quantified object, *pjati malčikam*, 'five $boys_{dat}$', is assigned dative case lexically by the verb *pomogla*, 'helped'.

(5) Ja pomogla pjati malčikam.
I-NOM helped five-DAT boys-DAT.

The direct object in Russian normally appears with accusative case. In negated sentences, however, it receives genitive case (as in 6).

(6) Ja ne čital ètoj knigi.
I-NOM not read-PastT this-GEN book-GEN.

Genitive objects can also occur in affirmative sentences involving partitives (see 7).

(7) prinesi čaju
bring tea-GEN
'bring some tea'

This is called the *partitive genitive*, or the second genitive. Partitive genitive is not used very frequently in modern Russian and normally it has the same morphology as the first genitive. Genitive assignment under negation and in partitive constructions is also analyzed as structural case assignment by, for example, Pesetsky (1982). Like other structural cases, genitive case, as in (6) and (7), can be overridden by lexical case assignment. Moreover, genitive case is not dependent on thematic interpretation, and therefore it cannot be analyzed as inherent case. This brief overview shows that genitive case is a complex case in Russian. It does not have the limited distribution found in German; in fact it is a rather frequently used case.
There are some verbs that assign genitive case lexically to their objects - for example, *dobivat'sja*, 'to achieve', or *želat'*, 'to wish'. Verbs that govern genitive case tend to be verbs of desire, aim, request or achievement. These are not examined in this study.

The other Russian cases
Dative has been analyzed as a lexical case associated with the theta-role of benefactive, goal or experiencer (see 8). But it can also be assigned lexically by a preposition (see 9).

(8) On mne dal knigu.
He-NOM me-DAT gave book-ACC.
'He gave me the book.'

(9) On vyshël vopreki predpisaniju vracha.
He-NOM went out against doctor's orders-DAT.

Instrumental case functions as inherent case when it appears on instruments or agents of passive sentences (see 10a and 10b). That is, it does not depend on syntactic configuration or on theta-role assignment. Prepositional case assigned by a preposition is analyzed as lexical case assignment (see 11) (Babyonyshev, 1993).

(10) a. Ona udarila ego palkoj.
She-NOM hit him-ACC stick-INS.
'She hit him with a stick.'
b. On byl prinjat ministrom.
He-NOM was received minister-INS.
'He was received by the minister.'[3]

[3] Examples (10a) and (10b) are from Kilby (1986).

(11) a. Ivan rasskazyvaet nam o rabote.
Ivan is-telling us about work-PREP.
b. Ivan sidit na stole.
Ivan is-sitting on table-PREP.

An alternative account

Franks (1995) proposed a theory of case and case assignment for Slavic languages, such as Russian, in which he combined Chomsky's Case Theory with Jakobson's Case feature theory (1935). He assumed that there is a set of case features, as well as a set of other features, such as gender and number (following Jakobson, 1935), that is present on categories that need case and on categories that assign case. These features may be either fixed, that is, specified in the lexicon, or variable, that is, unspecified in the lexicon. Variable features need to be fixed at some point in the syntactic derivation. This fixing can be achieved via operations of government and agreement. The [-N] categories V and P are not morphologically marked for case, but realize it indirectly on their [+N] arguments. The case features of a noun are unspecified in the lexical entry of a noun. The case features of a case assigner, like V, are either specified or unspecified. When a verb assigns a specific case, this is represented in its lexical entry, and the case features are specified. This is what is called lexical case. When the case features in the lexical entry are unspecified, a verb assigns accusative case to its object structurally (the default accusative, as Franks called it). These unspecified case features of objects and verbs are set as accusative case (by government) at S-structure level. According to Franks, the accusative case is a default that appears on arguments of transitive verbs with unspecified case features, as well as on non-argument adverbial phrases of time and distance. The reason why he considers the accusative to be a default case is that it is overridden by the genitive of quantification, as we saw above (cf. Babby, 1987). In (12), the verb *čitat*, 'to read', has unspecified case feature values, which are specified as accusative on S-structure level.

(12) Ivan čital ètu knigu.
Ivan read this book-ACC[4].

Verbs without case features, or verbs that have specified case features, do not assign accusative case to an argument, but seem to be able to assign it to non-arguments (see 13a and 13b). The verb *spat*, 'to sleep', (13a) is intransitive and does

[4] Examples (12) and (13) come from Franks (1995).

not have case features. Thus it cannot have an accusative object; but still it seems to assign accusative case to the adverbial phrase *vsju noč*, 'all night$_{acc}$'. The same can be seen in (13b), where the verb *upravljat*, 'to manage', does have case features, which are specified in the lexicon as instrumental. Hence, the verb is unable to assign accusative case to the object *fabrika*, 'the factory'. Nevertheless, the verb is able to assign accusative case to the adverbial phrase *vsego odin god*, 'only one year$_{acc}$'[5].

(13) a. Ivan spal vsju noč.
Ivan slept all night-ACC.
b. ítot direktor upravljal *fabriku/fabrikoj vsego odin god.
This director managed the *factory-ACC/ factory-INS only one year-ACC.

Franks analyzed prepositions that assign accusative case in the same way as verbs, that is, they have unspecified case features. He, therefore, concluded that accusative is assigned to sisters of [-N] categories, that is, verbs and prepositions. In his account, nominative case is assigned under Spec-head agreement with AgrS at S-structure. There are some other cases that are determined structurally, according to Franks. He assumed that dative case is assigned structurally to sisters of V', as in (14a and b), both in single- and double-object sentences (compare Zeh's analysis of German double-object sentences, 1980). Instrumental case is assigned structurally to sisters of VP as in (15) in this theory.

(14) a. Lena [VP[V' podarila[NP:ACC knigu]] [NP:DAT svoemu drugu]]
Lena gave book-ACC her friend-DAT
b. Boris [VP[V' pomog][NP:DAT studentam]]
Boris helped students-DAT

(15) On el ikru rebënkom/pudami/ložkoj/dorogoj/ utrom/grešnym delom
he-NOM ate caviar-ACC child-INS/pood-INS/spoon-INS/road-INS/morning-INS/sinful business-INS
'he ate caviar as a child/ by the pood/ with a spoon/ on the road/ in the morning/ to our regret'
[VP[VP[V'el[NP:ACCikru]]][NP:INS rebënkom/pudami…]]

In this chapter, mainly Franks' analysis of the Russian case system will be followed, since it is the most elaborate available and is comparable to Haider's analysis of

[5] Other authors have assumed that adjuncts receive case *inherently* (Dürscheid, 1999).

German that was followed in Chapter 3. This means that nominative and accusative case are assumed to be assigned *structurally* by the verb. The instrumental case is also assigned *structurally* to sisters of VP. However, contrary to what Franks proposes, it is assumed that dative, when assigned by a verb, is assigned *lexically* (cf. Babyonyshev, 1993). This is in line with the analysis of German in Chapter 3 (cf. Haider, 1985). It is assumed that dative case assignment by verbs is specified in the verb's lexical entry. Case assignment by prepositions is not examined in this study.

The default case

Jakobson (1935) defined the Russian nominative as the naming form, a case without features. According to Babyonyshev (1993) nominative case is the default case in Russian. It is used in vocatives (often used by children), left-dislocated phrases, nominal and adjectival predicates, and in one-phrase utterances that cannot be analyzed as elliptical. In elliptical utterances, the noun is produced with the case that it would have had if the sentence had not been elliptical.

Elliptical speech

Russian allows for elliptical speech in which arguments, verbs and even complementizers may be omitted, as long as they are recoverable from the context or the discourse. This is also called discourse ellipsis (see Franks, 1995).

Arguments can be omitted, as in (16a) and (16b), which may be answers, respectively, to the questions 'Did Ivan buy a newspaper?' and 'Did you introduce Ivan to Masha?' (the omitted arguments are given in brackets in the English translation).

(16) a. Net, ---- ne kupil ----
No, (he) didn't buy (it)

b. Da, ---- predstavil ---- ----
Yes, (I) introduced (him) (to her)

Not only arguments, but also verbs, can be omitted in some contexts. In (17a), for example, the verb *prosjat*, '(they) ask', is omitted, and in (17b) some verb of motion can be understood, like *prišël*, 'arrived'.

(17) a. Tebja ---- k telefonu
You (are being called) to the phone.

b. počemu ty tak pozdno ----?
Why have you (come) so late?[6]

Thus, it is possible to produce utterances with case-marked nouns or pronouns without an overt case-assigning verb. These utterances are constrained by context in that the verbs that are left out are understood in the context.

Language acquisition
Babyonyshev (1993) investigated the acquisition of the Russian case system by children. She presented data on two children obtained during a period of six months (child 1 aged 2;1-2;7, child 2 aged 1;6-2;0). Although these children used some bare nouns, that is, nouns from which the case marking is stripped (noun stems), most of the time they used nouns with morphological case marking, and they did so in all stages of the investigation. A second observation was that these children used nominative case more often than any other case, which was explained by the fact that they used nouns most often in a structural position that required nominative case. Only 8% of the DPs in non-nominative positions had nominative case. In other words, they did not use nominative case randomly as a default case. Babyonyshev also mentioned that the children seemed to have more problems with lexical case assignment than with structural case assignment. Overall, the children were, however, quite successful in using most cases. Only a few case errors were made. The instrumental case was not found in the data of these children.

4.3 APHASIOLOGICAL BACKGROUND

This section provides some comprehension data on Serbo-Croatian-speaking agrammatic patients. Until now, no comparable experiments have been done with Russian-speaking agrammatic patients. Since Serbo-Croatian and Russian are comparable languages, considering their case-marking properties, these Serbo-Croatian studies can give some idea of the use of case morphology in agrammatic comprehension. After this, production data of studies performed with Russian agrammatic speakers are presented. This section ends with a hypothesis on case assignment in Russian agrammatic aphasia.

[6] The examples (16) and (17) are taken from Franks (1995).

The role of case marking in comprehension data

Smith and Mimica (1984) showed that Serbo-Croation speaking Broca's aphasic patients were much less sensitive to case-marking information in a sentence comprehension task than a group of non-brain-damaged speakers. The patients, however, were not impaired in their use of semantic information to solve the comprehension task. In another study, Smith and Bates (1987) repeated this comprehension experiment and examined the use of case morphology and gender morphology. Again a decrease in the sensitivity to case marking was demonstrated. Their results, however, also indicated that there was no loss of sensitivity to gender agreement, although it was lower than normal. Lukatela, Crain and Shankweiler (1988) performed a grammaticality judgment task with agrammatic Serbo-Croatian-speaking patients and argued that the sensitivity to inflectional morphology was preserved in them. The authors claimed that 'the fact that they correctly rejected ungrammatical sentences 88% of the time is clear evidence of their retained sensitivity to closed–class morphology'.

Case marking in Russian agrammatic production

Tsvetkova and Glozman (1975) analyzed the spontaneous speech of patients with Broca's aphasia[7] and observed that pronouns and verbs were often omitted. Their aphasic speakers made many word order errors, as well as case substitution errors with nouns, using nominative case instead of other cases. They also made gender and number errors, although less often than case substitution errors. The patients had problems with the production of verbs, though they only rarely replaced a finite verb with a non-finite one.

Luria (1976) described the agrammatic speech of Russian aphasic patients as follows: there is no defect in the semantic scheme of communication; however, the difficulties arise much nearer to the surface syntax structure of expression, and the encoding of verbal communication begins to be distinctly impaired in its basic syntactic stages. His patients with telegraphic speech could repeat single words and were able to name objects, but they had considerable problems in repeating sentences. They either omitted the predicative (verbal) part of the sentence or displaced it with the nominative (substantive) part of the sentence. The results of a repetition task performed with one agrammatic-speaking patient also showed that the verb of the sentence was usually omitted, and that dependent nouns which should have had accusative or dative case, for example, were usually produced with nominative case. According to Luria, this patient knew that his use of nominative case was wrong, but he was unable to correct it. A sentence like (18a) was repeated

[7] In Russia, the terminology of Luria is used. So Tsvetkova and Glozman actually wrote about motor aphasia.

as (18b or c). In (18b) the verb is missing and only two nominative nouns have been produced, whereas in (18c) the verb is produced in the non-finite form and the object has accusative case. Note that this follows the pattern that was observed for Dutch and German: there is no case marking on nouns or the default case is used (which is nominative in Dutch, German and Russian), if no case assigner is present.

(18) a. Mal'chik udaril sobaku.
boy-NOM hits dog-ACC
'The boy hits the dog.'
b. mal'chik … sobaka
boy-NOM … dog-NOM
'the boy … the dog'
c. mal'chik … sobaku udarit
boy-NOM … dog-ACC to hit-INF
'the boy … the dog hitting'

These phenomena were even more pronounced in the spontaneous speech of another group of agrammatic-speaking patients. According to Luria, in the speech production of severely affected patients there were far fewer verbs than in normal speech, whereas there was a corresponding increase in the number of nouns. The number of nouns in non-nominative cases (like accusative and dative) decreases, and the number of nominative case-marked nouns rose correspondingly (see also Tsvetkova, 1969; Ryabova, 1970).

Akhutina (1991) analyzed the speech production of 8 patients with Broca's aphasia[8] who produced agrammatic speech. She analyzed samples of speech production obtained in successive stages of the aphasia and found that half of the patients predominantly used pure nominations at the onset of aphasia, which developed into noun-noun-verb structures (NNV structures), and finally changed into NVN and other structures. She found many case substitution errors. The distinction between nominative and accusative case was found in the samples that were acquired at the onset of the aphasia. In later stages, genitive and prepositional case were used as well. Dative and instrumental case were acquired after the four other cases.

[8] Since Akhutina tested her patients with the Luria material (1969), the patients were actually diagnosed as having efferent motor aphasia. This is equivalent to Broca's aphasia. The term Broca's aphasia is preferred here so that the same terminology can be used for all patients described.

Hypothesis and Research questions

The results of the German and Dutch experiments (Chapter 2 and 3), as well as the linguistic theories that assume that there is a relationship between DPs and case assigning categories, lead to the following hypothesis for Russian agrammatism:

> **In Russian agrammatic speech, the production of correctly case-marked noun phrases (DPs) is related to the realization of a case-assigning category, such as the finite verb in AgrS, the transitive verb in AgrO or a preposition.**

If problems with (finite) verbs and prepositions result in problems with DPs, as was observed for German, there are four possible patterns of DP production in Russian agrammatism that could support this hypothesis (following Babyonyshev (1993), who proposed the same for child language). When no case-assigning category is present:

A. Russian agrammatic patients will overuse the default nominative case;
B. Russian agrammatic patients will use all case-marked forms randomly;
C. Russian agrammatic patients will produce caseless forms, that is, they will omit the case marking and produce noun stems;
D. Russian agrammatic patients will avoid the production of DPs.

In addition to this hypothesis, and based on the competitive linguistic views on different cases, and various ways of case assignment, some questions can be asked with regard to case assignment and case morphology in Russian agrammatic speech:

- Is there a difference between nominative, accusative, dative and instrumental case assignment?
- Is there a difference between structural and lexical (and inherent) case assignment?

Two tasks of the German test battery described in section 3.4 were adapted for Russian to examine the case-marking performance of Russian agrammatic aphasic speakers, to test the hypothesis, and to provide an answer to the questions.

4.4 METHODS

In this section the participants in the study are described, as well as the test materials used and the chosen methods of analysis.

Participants

This study was conducted with 7 Russian-speaking agrammatic aphasic patients (4 male, 3 female; mean age 46,1). They all lived in the St Petersburg region. Four patients were aphasic due to a stroke in the left hemisphere; the other three patients became aphasic after traumatic brain injury. The patients were diagnosed with the Luria test material (Luria, 1969). According to his terminology, the patients had efferent-motor aphasia (e.g. Broca's aphasia), and were diagnosed as being agrammatic by their speech therapist. They spoke in telegraphic style. A brief speech sample of each patient and individual data on lesion sites is given in Appendix I.

Ten non-brain-damaged Russian speakers were tested as a control group for the experimental data. These speakers also came from the St Petersburg region (8 male, 2 female; mean age 46,5). Individual data on the control group are given in Appendix II.

Materials

Data were obtained from three tasks - free speech, a DP-insertion task, and a sentence production task. The DP-insertion task was divided into two parts because of the large number of items. The sentence production task was conducted between these two parts. A break was given after each task. With most patients, the experiments were carried out in two sessions of one hour. It took the agrammatic speakers about two hours to complete the whole test battery. The non-brain-damaged speakers could finish it in about twenty minutes. All experiments were recorded on audiotape and transcribed orthographically afterwards. The experiments were also scored during testing. The testing was done by a Russian qualified speech therapist, and the scoring during testing was done by a Russian linguist.

First, a free speech sample was elicited (Task I). This was done with a semi-structured interview in which the patient had to answer such questions as 'Can you tell me how your illness started?', 'Can you tell me something about your job?' and 'Can you tell me about your family?'. When these did not yield enough speech, the patients were also asked to retell a familiar story or to describe a recipe they liked. This free speech was analyzed to examine whether the patients produced correctly case-marked DPs and whether they produced these DPs in the correct context, that

is, in the presence of a case-assigning category. Note that, in some contexts, it is possible to omit the case-assigning verb, since in Russian it is possible to produce elliptical speech. The data of the speech production were compared to the data of the experimental tasks.

After the interview, the experiments were performed. One consisted of a sentence production task (Task II), which was conducted between the two parts of the DP-insertion task. Thirty pictures were chosen from the set that was also used for the DP-insertion task (Task III). The patients were shown a picture and asked to say in one brief sentence what happened on it. Figures (2a) and (2b) show two examples. In these items, the patient was supposed to produce *muzhchina tseluet zhenschinu* (the man_{nom} kisses the $woman_{acc}$) for Figure (2a) and *zhenschina dajot muzhchine salat* (the woman gives the man the salad) for Figure (2b). The pictures were chosen to elicit several different structures. Ten pictures depicted an action with a single object, which could be described by a verb that assigned nominative case to the subject and accusative case to the object. Five pictures elicited single-object sentences with a verb that assigned dative case to the object. Five more items elicited double-object sentences, with an accusative direct object and a dative indirect object. Ten pictures depicted single-object sentences for which, apart from an object, an instrumental should also be produced. These pictures were presented randomly. This test was included to examine how the case-marking abilities of the patients were influenced by the fact that they had to produce the correct context for case assignment themselves. In other words, are the patients able to produce the correct case-assigning verb, and if so, are they able to correctly case-mark the DPs? Do these patients produce case-marked DPs if no case-assigning category is realized? Which case do these DPs have?

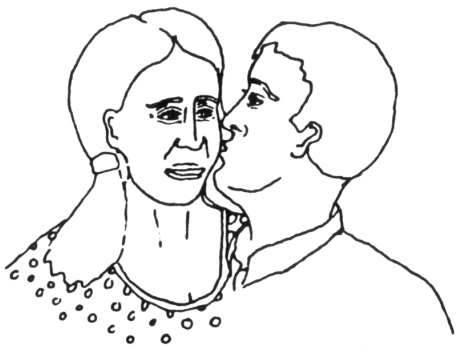


Figure 2 a

Figure 2b

Figure 2: two examples of the sentence production task

The other experimental test was a DP-insertion task (Task III), divided into two parts because of the large number of items. The whole test contained 90 items. Each item consisted of a picture with an incomplete sentence underneath (see Figures 3a, b and c) in which a DP had to be inserted. Either the subject DP, the object DP, or the instrumental DP was missing. The patients were asked to read the sentence (or repeat it in case of reading difficulties) and insert the missing DP. The sentence under Figure (3a), for example, should elicit something like *zhenschina nesjot muzhchinu* (the woman$_{nom}$ carries the man$_{acc}$). The item under Figure (3b) should be completed as *zhenschina dajot muzhchine galstuk* (the woman$_{nom}$ gives the man$_{dat}$ the tie$_{acc}$), whereas Figure (3c) is meant to elicit an instrumental object such as *devochka pishet pisjmo ruchkoj* (the girl$_{nom}$ writes the letter$_{acc}$ with the pen$_{ins}$). This task was meant to examine whether the patients were able to produce a correctly case-marked DP when the case-assigning verb was given. Six different conditions were tested (see 19 for examples, the correct reaction being given after the arrow).

(19) A. *Nominative subject DPs in single-object sentences*
….. privetstvuet zhenschinu → **muzchina** privetstvuet zhenschinu
the man-NOM greets the woman-ACC

B. *Accusative object DPs in single-object sentences*
zhenschina nesjot ….. → zhenschina nesjot **muzhchinu**
the woman-NOM carries **the man**-ACC

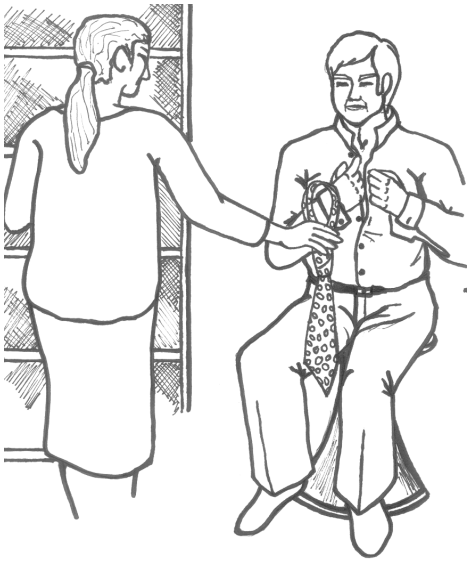
C. *Dative object DPs in single-object sentences*
zhenschina pomogaet ….. → zhenschina pomogaet **muzhchine**
the woman-NOM helps **the man**-DAT

D. *Accusative object DPs in double-object sentences*
zhenschina dajot muzhchine …..
→ zhenschina dajot muzhchine **galstuk**
the woman-NOM gives the man-DAT **a tie**-ACC

E. *Dative object DPs in double-object sentences*
zhenschina prinosit ….. paket → zhenschina prinosit **muzhchine** paket
the woman-NOM brings **the man**-DAT a package-ACC

F. *Instrumental DPs in single-object sentences*
devochka pishet pisjmo ….. → devochka pishet pisjmo **ruchkoj**
the girl writes the letter **a pen**-INS (with a pen)

женщина несёт …..
the woman carries …..



женщина даёт ….. галстук
the woman gives ….. a tie

девочка пишет письмо …..
the girl writes the letter …..

Figure 3: Three examples of the Russian DP-insertion task

With this task, it was possible to make comparisons between subject case assignment (condition A) and object case assignment (condition B and C), as well as between structural (accusative and instrumental: condition B and F) and lexical case assignment (dative: condition C). Also, it was possible to see if there was an effect of sentence complexity by comparing accusative and dative assignment in single- (condition B and C) and double-object sentences (condition D and E).

Figure 4 gives an overview of the different tasks that were used in this Russian study.

TASK I	*Free speech:* - interview about history of illness, hobbies, job etc. - retelling of a fairy tale or a familiar story
TASK II	*Sentence production:* - nominative, accusative, dative and instrumental case - single- and double-object sentences - the case-assigning (finite) verb has to be produced by the patient
TASK III	*DP-insertion with pictures:* - nominative, accusative ,dative and instrumental case - single- and double-object sentences - the case-assigning (finite) verb is given

Figure 4: An overview of all tasks conducted in the Russian study.

Scoring system

The free speech and the utterances of the sentence production task were analyzed with regard to the realization of case marking in relation to the realization of case-assigning categories such as verbs (and prepositions). When more than one response was given for an item on the sentence production task, the response that matched the picture best was analyzed. All DPs were counted, and for each DP it was examined whether a proper case-assigning category was present and whether the DP was case-marked correctly. The difference between correctly case-marked and incorrectly case-marked DPs for which a case-assigning category was present was tested statistically. This was done to examine whether the agrammatic patients could correctly case mark DPs, when they had produced the case-assigning category. To test whether Russian agrammatic speakers overused the default

nominative case when no case-assigning category was present, the difference between the number of nominative case-marked DPs and non-nominative case-marked DPs without a case-assigning category was tested statistically. In (20a) and (20b), examples are given of, respectively, a correctly case-marked DP in the presence of a case-assigning verb and an incorrectly case-marked DP. In (21a) and (21b) there are examples of DPs for which no case-assigning category was present; in (21a) a DP with nominative case is shown, and in (21b) a DP with instrumental case.

(20) a. Zhenschina tseluet muzhchinu.
woman-NOM kisses man-ACC
'The woman kisses the man.'
b. Zhenschina tseluet muzhchine.
woman-NOM kisses man-DAT
'The woman kisses the man.'

(21) a. dom… kwartira…shkola…nu
house-NOM…apartment-NOM …school-NOM well
b. gruzstikom. pelmenji, morozhenoje
carrier-INS. dumplings-NOM, ice cream-NOM

To answer the question (see section 4.3) whether there is a difference between the various cases under investigation (nominative, accusative, dative and instrumental) or between different types of case assignment (lexical versus structural), the experimental tasks were analyzed quantitatively. It was established whether correctly case-marked DPs were produced and, if so, how many. The responses on the sentence production task were also analyzed with regard to the production of case-assigning categories, that is, (finite) verbs and prepositions. It was examined whether verbs are produced and, if so, whether these verbs matched the action that was depicted in the picture.

After this, it was examined whether the target DPs were produced correctly. DPs were considered to be correct if they were produced with the correct case marking. The errors on the DPs were analyzed qualitatively. The error types were divided into three classes: case substitution, omission of the case marking, and other errors (nil or irrelevant reactions). See (22) for examples.

(22) a. *Case substitution*
Muzhchina storozchit **zhenschina**.
man-NOM guards woman-NOM
Goal: Muzhchina storozchit zhenschinu.
man-NOM guards woman-ACC
'The man guards the woman.'

b. *Omission of the case marking*
Devochka maschet **muzhchin**.
girl-NOM waves man-0
Goal: Devochka maschet muzhchine.
girl-NOM waves man-DAT
'The girl waves the man.'

c. *Other errors*
Devochka pishet pisjmo **komnatu**.
girl-NOM writes letter-ACC room-ACC
Goal: Devochka pishet pisjmo ruchkoj.
girl-NOM writes letter-ACC pen-INS
'The girl writes the letter with the pen.'

Statistical analysis
Since the group of aphasic participants was relatively small, all comparisons were tested non-parametrically. To compare the aphasic speakers and the non-brain-damaged speakers, Mann-Whitney-U tests were conducted, and to test within group scores, Friedmann's test and/or Wilcoxon signed rank tests were used.

4.5 RESULTS

The results on each task are shown, starting with an analysis of the free speech samples. After this, the results of the sentence production task are presented. These results are analyzed with regard to the realization of case-assigning categories and the realization of case marking on nouns. Then, the performance on the DP-insertion task is shown. This is followed by a comparison of the results on the different tasks. Subsequently, the results of an error analysis are presented. A summary of the most important results is given at the end of the results section.

Task I: Free speech

In total, 172 DPs were produced in the speech samples elicited with interviews and story-telling. All DPs were produced with case morphology, that is, no noun stems were produced by the agrammatic speakers. Table 2 shows that 73 DPs were produced in the context of a case-assigning category (42,4%), and only one of these was case-marked incorrectly. For individual data, the reader is referred to Appendix III.

If a case-assigning category was present, significantly more correctly than incorrectly case-marked DPs were produced (Wilcoxon signed rank test, z=-2,366, p<0,05). For 99 DPs (57,6%) no case-assigning category was produced. Of these DPs 80 were nominatives, and 19 of these DPs had other case morphology. The agrammatic aphasic speakers used the default nominative case significantly more often than non-nominative cases when no case-assigning category was present (Wilcoxon signed rank test: z=-2,201, p<0,05).

	+ Case assigner		**- Case assigner**	
	correct case marking	*incorrect case marking*	*default case marking*	*other case marking*
number	**72**	1	**80**	19
mean	10,29	0,14	11,43	2,71
SD	6,16	0,38	6,55	2,14

Table 2: Case marking used in the presence or absence of a case-assigning category in the free speech of the agrammatic speakers (task I). Expected scores are in **bold**.

Task II: DPs in the sentence production task

One of the agrammatic patients was not tested with the sentence production task (RUS4). The scores of the remaining patients are depicted in Tables 3 to 6. Table 3 shows the performance of the Russian agrammatic speakers on verb production in the sentence production task (individual results are shown in Appendix IV). In total, 180 items were analyzed. Three utterances were unanalysable. For most sentences, a finite verb is realized (n=162, 91,5%). Only 10% (n=18) of items were produced with an incorrect verb, that is, with a verb that did not match the action depicted. For only 8,3% (n=15) of the items no verb was produced. In other words, a proper case assigner was present most of the time.

	correct V	**incorrect V**	**no V**	**unanalysable**
number	144	18	15	3

Table 3: Verb production performance on the sentence production task by the agrammatic speakers.

Table 4 (p. 135) shows the distribution of correctly and incorrectly case-marked DPs in relation to the realization of a case-assigning verb in the sentence production task (see Appendix V for individual results). The results on the subjects are presented in the upper part of the table and the results on the objects are shown in the lower part. In total, 364 DPs were analyzed, of which 170 were in subject position and 194 in object position. As for subject DPs, 159 were realized with a case-assigning finite verb. When a case-assigning finite verb was produced, significantly more DPs were case- marked correctly (n=151, which is 95%) than incorrectly (n=8, which is 5%; Wilcoxon: Z=-2,207, p<0,05). However, when no case-assigning finite verb was produced, there was no significant difference between the number of subjects with the default nominative case (n=10, which is 90,9%) and the number of subject DPs with a non-nominative case (n=1, which is 9,1%; Wilcoxon: Z=-1,841, p=0,66). For object DPs, the same pattern was found. Significantly more correct (n=138, which is 82,6%) than incorrect object DPs (n=29, which is 17,4%) were produced when a case- assigning verb was realized (Wilcoxon: Z= -2,207, p<0,05). When no verb was present, there was no significant difference between the number of object DPs with the default nominative case (n=12, 44,4%) and object DPs with other cases (n=15, 55,6%; Wilcoxon: -0,816, p=0,414). In other words, case was assigned correctly more often than incorrectly when a case-assigning verb was present. When the patients produced no case-assigning verb, they had no preference for the default case, as opposed to what was found in the free speech samples.

In Table 5, the performance on all DPs of the agrammatic patients and the non-brain-damaged speakers is presented (individual scores are given in Appendix VI). Note that the number of DPs is larger in Table 5 than in Table 4, which is caused by the fact that all DPs are taken into account for measuring the case-marking performance, and not only subject and object DPs (as in Table 4). Since only two errors were found in the data of the control group, these will no longer be considered. The patients produced a total of 434 DPs, of which 75 (17,3%) were incorrect. All patients made errors with the DPs in the sentence production task.

	Subjects			
	+ Vfin		**- Vfin**	
case→	*correct*	*incorrect*	*default*	*other*
number	**151**	8	**10**	1
mean	25,17	1,33	1,67	0,17
SD	7,57	2,80	2,25	0,41
	Objects			
	+ V		**- V**	
case →	*correct*	*incorrect*	*default*	*other*
number	**138**	29	**12**	15
mean	23,0	4,83	2,00	2,50
SD	6,72	3,43	3,03	3,56

Table 4: Case marking, with or without a case-assigning category in subject and object position, in the sentence production task by the agrammatic speakers (task II). Expected scores are in **bold.**

	Agrammatic speakers	**non-brain-damaged speakers**
# DPs		
number	**434**	**739**
mean	72,3	73,9
# errors		
number	**75**	**2**
mean	12,5	0,2

Table 5: Number (and mean) of DPs and number of errors produced in a sentence production task (task II).

As Table 6 shows, nominative DPs (i.e. DPs in subject position) are produced most frequently (n=170) in this task. Individual results are given in Appendix VII. There were 30 items in this task, and most patients realized a subject DP for all items, although they were not always correctly case-marked. Overall, only 7 subjects were omitted. Accusative, dative and instrumental case were not elicited in each item. As a consequence, the numbers were lower for these cases. A Friedman test performed with the percentages correct on each case showed that there is no effect of case

(Chi square=6,458, df=3, p=0,091). This means that there is no difference in the performance on the different cases. This is due to the fact that patients differed with respect to the case that causes the most problems, as can be seen in Appendix VII.

DPs in position:	**NOM**	**errors with NOM**	**ACC**	**errors with ACC**	**DAT**	**errors with DAT**	**INS**	**errors with INS**
number	170	**16**	146	**22**	56	**17**	55	**18**
mean	28,8	2,7	24,3	3,7	9,3	2,8	9,2	3

Table 6: Number of DPs (and mean number) produced in nominative, accusative, dative and instrumental position with the number of errors produced by the agrammatic patients. NOM=nominative, ACC=accusative, DAT=dative, INS=instrumental. The numbers of errors are in **bold**.

Task III: DP-insertion task

The results on the DP-insertion task are shown in Table 7. For individual patient scores see Appendix VIII. Overall, the patients performed significantly worse than the control group of non-brain-damaged speakers (MWU: z=-3,314, p<0,001). The patients produced 74% of the DPs correctly, whereas the non-brain-damaged speakers had a score of 98,2% .

	Single-object sentences				**Double-object sentences**	
	NOM	**ACC**	**DAT**	**INS**	**ACC**	**DAT**
agrammatic patients						
mean	84,3	78,6	60	66,4	90	57,1
SD	21,7	14,4	32,7	33,0	15,3	28,7
non-brain-damaged speakers						
mean	100	100	93	97,5	100	96
SD	0,0	0,0	8,2	5,4	0,0	7,0

Table 7: Mean percentages correct (and SD) on the insertion of DPs in single- and double-object sentences (task III). NOM=nominative, ACC=accusative, DAT=dative, INS=instrumental.

Single-object sentences

The agrammatic aphasic patients had a significantly lower score than the non-brain-damaged speakers on the insertion of nominative subjects and accusative and dative objects in single-object sentences (nominative, MWU: z=-2,266, p< 0,01; accusative, MWU: z=-3,827, p<0,001; dative, MWU: z=-2,709, p<0,01). The production of instrumental DPs was also impaired in the agrammatic patients (MWU: z=-3,102, p<0,01).

There was no significant difference between the insertion of nominative subject DPs and accusative object DPs by the agrammatic speakers (Wilcoxon, z=-1,187, p=0,235). The insertion of nominative DPs was less problematic than the insertion of dative object DPs (Wilcoxon: z=-2,205, p<0,05). Dative object DPs were, however, not more difficult to insert than accusative object DPs (Wilcoxon: z=-1,270, p=0,204).

Double-object sentences

The scores on the insertion of both accusative and dative objects in double-object sentences were significantly lower for the agrammatic aphasic speakers than for the non-brain-damaged speakers (accusative, MWU: z=-2,201, p<0,05; dative, MWU: z=-3,158, p<0,01).

Single- versus double-object sentences

The insertion of accusative DPs in double-object sentences (SVOO) was significantly less difficult than the insertion of accusative DPs in single-object sentences (Wilcoxon: z=-2,388, p<0,05) for the agrammatic speakers. There was no such difference between the insertion of dative objects in single- and double-object sentences (Wilcoxon: z=-0,272, p=0,785), implying that the insertion of dative objects was equally difficult in single- and double-object sentences. No significant differences were found between the insertion of accusative and dative objects in single- and double-object sentences in the non-brain-damaged control group (accusative, Wilcoxon: z=0,00, p=1; dative, Wilcoxon: z=-1,342, p=0,180).

The two tasks compared: DPs in the sentence production and in the DP-insertion task

There was no difference between the proportion of correctly case-marked DPs in the sentence production and the DP-insertion task; see Figure 5 (nominative, Wilcoxon: z=-0,365, p=0,715; accusative, Wilcoxon: z=-0,314, p=0,753; dative, Wilcoxon: z=0,00, p=1,0; instrumental, Wilcoxon: z=-0,841, p=0,40). Therefore, these data were taken together to answer the question whether there is a difference between nominative, accusative, dative and instrumental case assignment in Russian agrammatic aphasia. A statistical analysis of nominative, accusative, dative and

instrumental case marking by the agrammatic speakers revealed that not all cases were equally well preserved (Friedman test, Chi-square=10,029, df=3, p<0,05).

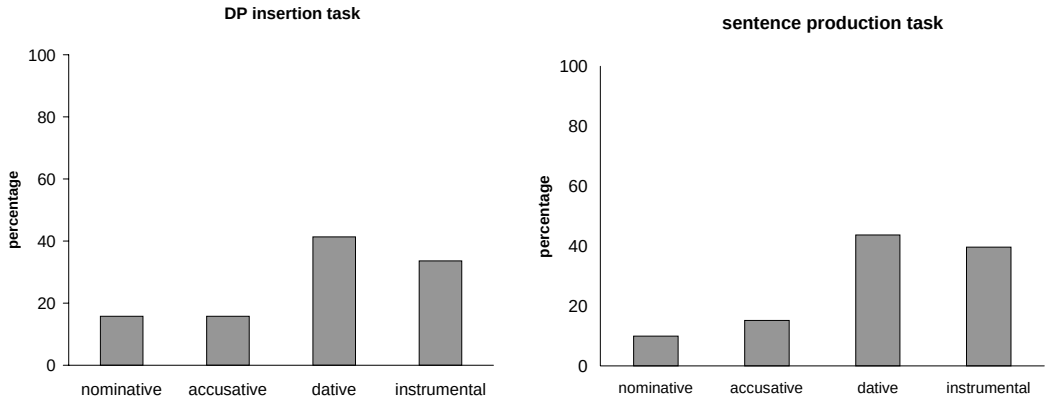


Figure 5: Distribution of incorrect case marking of nominatives, accusatives, datives and instrumentals in the noun phrase insertion task (left) and in the sentence production task (right).

Post-hoc analyses showed that there was no difference between nominative and accusative case assignment (Wilcoxon: z=-1,183, p=0,237), which means that these are equally difficult for the Russian agrammatic patients. Also, no difference was found between nominative and instrumental case assignment (Wilcoxon: z=-1,521, p=0,128) or between dative and instrumental case (Wilcoxon: z=-0,931, p=0,352). The performance on nominatives and datives, however, differed significantly (Wilcoxon: z=-2,366, p<0,05), showing that dative assignment was more difficult for these patients than nominative assignment. Dative case was also more impaired than accusative case (Wilcoxon: z=-2,197, p<0,05). Finally, the production of instrumental case was significantly more difficult than the production of accusative case (Wilcoxon: z=-2,028, p<0,05). In other words, dative case was the most impaired case in these patients, whereas instrumental case was less impaired. Nominative and accusative were the least impaired cases.

Error analysis

The analysis of the free speech samples showed that only one of the DPs for which a case assigner was present was case-marked incorrectly. Two DPs were marked for accusative case, although the obligatory case-assigning preposition was absent. Five DPs were marked with prepositional case without a case-assigning preposition. All other DPs (n=12), for which no overt case-assigning category was present, could be

analyzed as elliptical utterances, for which the case assigner could be recovered from discourse context. Most of these concerned instrumental case.

The patients made 75 errors with 434 DPs in the sentence production task (Task II). The distribution of the error types found in the sentence production data is shown in Table 8. In the sentence production task, the agrammatic patients made predominantly case substitution errors (81% of the errors), as opposed to case-marking omissions and other errors (19% of the errors). Most of these case substitution errors were caused by overgeneralization of nominative case (43% of all errors). Dative case was also used regularly instead of another case (25% of all errors). Accusative (9% of the errors) and genitive case (4% of the errors) were used relatively rarely instead of another case. Not all morphological cases were used equally often instead of another case in the sentence production task (Friedman test: 8,895, df=3, p<0,05). Post-hoc analyses revealed differences between the number of nominative and genitive substitution errors and between the number of accusative and genitive substitution errors. Nominative substitution errors occurred significantly more often than genitive substitution errors (Wilcoxon, z=-2,023, p<0,05), and accusative substitutions occurred more often than genitive substitution (Wilcoxon, z=-2,023, p<0,05). All other substitution error numbers, however, did not differ from one another (nominative vs. accusative, Wilcoxon: z=-0,105, p=0,917; nominative vs. dative, Wilcoxon: z=-1,183, p=0,237; accusative vs. dative, Wilcoxon: z=-1,153, p=0,249; dative vs. genitive, Wilcoxon: z=-1,183, 0,237).

The patients made 164 errors with the insertion of DPs (Task III), which is 26% of all DPs (see Table 8). Mainly case substitution errors (75% of all errors) were made by the agrammatic patients. Only 3% of the errors consisted of the omission of the case- marking morpheme. For 22% of the DPs 'other' errors were made. This group of errors consisted of irrelevant and nil reactions and omissions of the entire DP. Most errors were 'substitutions by nominative' (29%) or 'substitutions by accusative' (26%). Sometimes dative was used instead of another case (13%), and relatively rarely was the genitive case marking chosen erroneously (7%). No significant difference was found between the four case substitution types (Friedman test: Chi-square= 6,81, df=3, p=1,57).

# errors	**# case substitution**	**# case omission**	**# other errors**	**# errors/ # items**
sentence production (task II)	61	11	3	75/434
DP-insertion (task III)	123	5	36	164/630
total	184	16	39	239/1064

Table 8: Error type distribution of both tasks.

A comparison of the error distributions of the two different tasks showed that these were not entirely the same. A Wilcoxon signed rank test showed that in the sentence production task more nominative substitution errors were made than in the DP-insertion task ($z=-2{,}201$, $p<0{,}05$). No other significant differences were found for the case substitution errors, which means that the proportions of accusative, dative and genitive substitution errors are similar in the sentence production and the DP-insertion task (accusative: $z=-1{,}782$, $p=0{,}75$; dative: $-0{,}524$, $p= 0{,}600$; genitive: $z=-0{,}730$, $p=0{,}465$).
Looking at the individual data on both tests, differences showed up. Some patients had a clear preference for one particular case, which they overused, while others had no such preference. Patient RUS1 did not make many errors overall. Patients RUS2 and RUS5 mainly overused nominative case, and their score on nominative subjects was therefore relatively good. Patient RUS4 predominantly overused accusative case, whereas patient RUS3 preferred dative case. Patients RUS6 and RUS7 overused both accusative and nominative case.

Summary
The results of the free-speech analysis and the sentence production task showed that the Russian agrammatic speakers produced more correctly case-marked DPs than incorrectly case-marked DPs when a case-assigning category was present. When no case assigner was present, the patients preferred to use the default nominative case in free speech production. This preference, however, was not found for the sentence production task. The agrammatic patients performed worse on the insertion of DPs than the non-brain-damaged speakers, and this held for all four cases - nominative, accusative, dative and instrumental. A comparison of both tasks showed that not all cases were equally well preserved. Dative case was the

most difficult for these patients, followed by instrumental case. Accusative and nominative case were the least problematic. Most errors were in case substitution, and no clear pattern emerged in the DP-insertion task. In the sentence production task there was a preference for using the default nominative case instead of another case. However, there was no clear overgeneralization pattern. Each patient seemed to have a different pattern in this regard, unlike the German patients who were presented in Chapter 3.

4.6 Discussion

The relation between DPs and case-assigning categories

The results of this study support the hypothesis formulated in section 4.3, namely, that the production of correctly case-marked noun phrases (DPs) is related to the realization of a case-assigning category, such as a finite verb in AgrS, a transitive verb in AgrO or a preposition in Russian agrammatic speech. The results of both the free-speech analysis and the sentence production data show that, when a case-assigning category is realized, significantly more correctly than incorrectly case-marked DPs are produced by the Russian agrammatic speakers. When no case assigner is present, the patients prefer to produce the default nominative case in free speech production. This is in line with earlier descriptions of Russian agrammatism (Luria, 1976) that show that Russian agrammatic patients overuse nominative case in spontaneous speech. The results are also in line with findings on German and Dutch agrammatism (see Chapter 3 and Ruigendijk et al., 1999).

The Russian patients who participated in this study exhibit some problems with case marking in their free speech production, though when a case-assigning category is present they make virtually no errors with case marking. When they do not realize a case-assigning category for a noun phrase, they seem to avoid problems by resorting to a default strategy.

More case marking problems arise in the sentence production and the DP-insertion task. When the case-assigning verb is omitted in the sentence production task, which happens relatively rarely (n=15), the patients do not prefer the default nominative case. However, again, when a verb is produced, significantly more correctly than incorrectly case-marked DPs arise. In the DP-insertion task also, where the case-assigning verb is given, more correct than incorrect DPs were produced.

Case assignment errors

As with the German patients, this cannot be the complete story. Even if the patients produce a case-assigning category, as they often do in the sentence

production task, and always in the DP-insertion task, they still make some errors with DPs. In fact, in both experimental tasks, more case marking errors are made than in the free speech samples. In the sentence production task, 8 subjects and 29 objects are case-marked incorrectly, although the case-assigning verb is present. In the DP-insertion task where the case-assigning verb is given, 26% of all DPs (n=164) are case-marked incorrectly. Case marking on subject DPs, however, is relatively unimpaired both in the sentence production and in the DP-insertion task. Most errors are made with object DPs and instrumentals. This is comparable to what has been found for the German agrammatic speakers. When errors are made in these tasks, they are mostly case substitution errors, which is also comparable with the German data. However, unlike the German patients, the individual Russian patients do not exhibit a clear overgeneralization pattern. Also, as opposed to the German patients, the Russian agrammatic patients make case substitution errors that lead to sentences with two nominative DPs, two accusative or even two dative DPs.

Although the patients have problems with the production of case-marked DPs, their production pattern does not fit one of the production patterns proposed by Babyonyshev (1993). The patients do not produce case randomly, since their case-marking performance is rather accurate. They almost never omit the case morphology, and also they do not avoid the production of DPs. The only pattern that fits at least the free speech samples is the use of a default nominative case. The patients resort to this strategy when no case-assigning category is present. However, this pattern is not found in the experimental tasks.
How, then, can the case substitution errors made in the tasks be explained? One explanation may be the fact that in the experimental tasks the patients cannot avoid their problems by using elliptical utterances or the default nominative case. It is obvious that they have to produce a complete sentence in the sentence production task with a verb and case-marked DPs. And this is exactly what they try to do. Most of the time all patients can produce a case-assigning finite verb and two (or three) argument DPs. However, these argument DPs are sometimes incorrectly case-marked, especially the object DPs and the instrumentals. Crucially, the only cases used erroneously are nominative and accusative (with the exception of one patient who used dative case). Note that Akhutina (1991) found that agrammatic patients in the earliest stages of recovery were only able to distinguish between nominative and accusative case. Nominative and accusative are both *structural* cases when assigned by the (finite) verb. There are no patients who produce prepositional, instrumental or genitive case instead of another. Prepositional case is assumed to be assigned *lexically*. Genitive case is analyzed as *lexical* case when it is assigned by a verb. However, in Russian, genitive case is also used in quantified DPs and after

negation, which is analyzed as *structural* case assignment (see e.g. Pesetsky, 1982). Instrumental case is assigned structurally, according to Franks (1995). Babyonyshev (1993), however, assumed that instrumental case is assigned *inherently* to instruments of actions. Let us assume that this is correct. The data can then be explained by assuming a dichotomy between *structural* case and *lexical* or *inherent* case, in that only structurally-assigned cases are used instead of other cases. Only those cases that can be assigned on the basis of the syntactic structure are available. That is, in an affirmative SVO sentence, only nominative and accusative case are available. Genitive case is not available (although it can be assigned structurally), since there is no genitive case assigner (quantification or negation).

In Chapter 3, the German data have been explained by assuming a preserved ability to assign case *structurally*, that is, based on the structural position of a DP and dependent on the presence of a case-assigning category. *Lexical* case assignment, however, is assumed to be impaired due to incomplete retrieval of the lexical information on verbs, or the inability to use this information in syntactic encoding. This information is needed for case assignment since it specifies which cases a verb assigns to its arguments. When this information is not retrieved correctly or completely, or when it cannot be used for syntactic encoding, lexical case assignment is not possible and lexical cases are not available. Since German patients have problems with *inherent* genitive case assignment also, it has been proposed that early stages of syntactic encoding are disturbed in these agrammatic patients (see also Bastiaanse 1995, 2001). Both lexical and inherent case assignment are assumed to take place at an early stage of syntactic encoding (i.e. at D-structure level in linguistic terminology). It is assumed that this holds for the Russian agrammatic patients too. First of all, they are able to select a verb and its argument DPs in the experimental tasks. However, they make case substitution errors with the argument DPs. Case errors are expected when the lexical information on the verb cannot be used for syntactic encoding. This is confirmed by the data. Moreover, six of the seven patients do not use lexical (or inherent) cases instead of another case. These cases do not seem to be available for overgeneralization or erroneous use. Structural case assignment is assumed to be unimpaired. If this is true, subject DPs should get nominative case and object DPs accusative. This happens often, but not always. Note that the Russian patients make case substitution errors that lead to sentences with two nominative or two accusative DPs, and one patient even produces sentences with two datives. A possible explanation is that word order is relatively free in Russian. It is not like German, where two word orders are possible but one is strongly preferred. In Russian, both word orders - *nominative DP-verb-accusative DP* and *accusative DP-verb-nominative DP* - can be used (as well as some others) and there is no strong preference for either one. The German patients seem to rely on a word order strategy (nominative-verb-accusative) which is unavailable

for the Russian patients. Possibly, Russian patients start a sentence with an accusative DP, produce a verb, lose track of what has been produced, and then produce a second accusative DP. Or, in the case of two nominatives, they start a sentence with a nominative DP, produce the verb, and, having lost track of how they started, produce a second nominative DP. Notice that it is expected that Russian agrammatic speakers do not have problems with the assignment of genitive case after quantification or negation, since this is analyzed as structural case assignment as well. The free speech data suggest that this is indeed so, since genitive case was produced in negated sentences. However, more experiments need to be performed to test this assumption.

Is there a difference between nominative, accusative, dative and instrumental case assignment? Is there a difference between structural and lexical (and inherent) case assignment?
Not all cases are equally well preserved in these agrammatic patients. Although there are considerable individual differences, it can be said that dative and instrumental cases are the most vulnerable, whereas nominative and accusative are relatively preserved. So, yes, there is a difference between nominative, accusative, dative and instrumental. Note that this is in line with the presumed dissociation between *lexical* (and inherent) and *structural* case assignment. *Structural* case assignment is assumed to be preserved in these agrammatic patients, whereas *lexical* and *inherent* case assignment at D-structure level are impaired.

4.7 CONCLUSION

Russian agrammatic speakers perform relatively well in the production of case marking. In free speech, they overuse the default nominative when no case-assigning category is present. In the experimental tasks, a case-assigning category is produced most of the time. Nevertheless, some errors are made, especially with the production of object DPs and instrumentals. These errors can be explained by assuming an impairment at the level of lexical and inherent case assignment which take place at D-structure level, whereas structural case assignment at S-structure level is relatively preserved.

APPENDIX I[A]: INDIVIDUAL DATA OF THE PATIENTS

Patient	*male/female*	*age*	*handed*	*time post-onset*	*brain damage*
RUS1	male	45	right	13;5	TBI
RUS2	male	37	right	3;5	TBI
RUS3	female	46	right	3;0	CVA
RUS4	female	48	right	0,4	CVA
RUS5	female	62	right	4;0	CVA
RUS6	male	53	right	13;0	CVA
RUS7	male	32	right	1;6	TBI

APPENDIX I[B]: A SHORT SPEECH SAMPLE FROM EACH PATIENT

Patient RUS1

Ну что сказать? Мать ... начальник отдела, потом забыл, начальником починки. Литейном ... ох, забыл ... Литейном. Там там ... глазной больницы. Очки Моховая улица, Литейном и ококло примерно 46 и мать.

Well how to say? Mother-NOM department-head-NOM [department should be INSTR case], then forgot, head of reparations-INSTR. Liteinom-PREP [obligatory preposition omitted] oh forgot Liteinom-PREP [obligatory preposition omitted] There there eye hospital-GEN [obligatory preposition 'near' omitted]. Lenses-NOM, is Mokhavaya street, Liteinom-PREP [obligatory preposition omitted] and near approximately 46 and mother-NOM.

Patient RUS2

Травма я нету . А потом я понял год назад Больница это голос нет Мысленно нормально, а речь нет ДСК начальник цеха Как его? Я не знаю Ну как его? Дом. Вот это дом я строил.

So well how injury-NOM I-NOM not and then I-NOM realized a year ago hospital-NOM so voice-NOM (should be GEN) no in-thoughts normally but speech-NOM no DSK chief-NOM workshop-GEN how so… I-NOM not know Well how so…? House-NOM So well house-NOM I-NOM built

Patient RUS 3

дом, квартира, школа … ну.. Господи… 5 лет (сколько?) [writes 8]. Луки (Великие Луки) училище … фельдшер… 5 лет … так и село и я один, два … и Псков … ну работать нет… завод… фабрика.

House-NOM, appartment-NOM, school-NOM … well… oh God … 5 years (how long?) [writes 8] Luki (Velikie Luki) vocation school … village-nurse-NOM .. 5 years-GEN so and village-NOM and I one, two… and Pskov… so… to-work - INFINITIVE no… factory-NOM… machine shop-NOM.

Patient RUS 4

Муж есть сын внук. Еще чего? (не?)правильно. А внук пойдет он… не сказать … не сказать теперь. За город. Нет, внук пойдет. Не сказать мне пока.

Husband-NOM is son-NOM grandson-NOM. What else? (in)correct. And grandson-NOM will-go he … not to say not to say now… Out city-NOM. No, grandson-NOM will-walk. Not to say, not to say yet.

Patient RUS 5

Где вы живете? Расскажите мен о вашей квартире, семье, что они делают?

Нас пять человек ж семье. Я, дочь моя и зять, внучка Вика. Ну Настенька, квартира двухкомнатная. *Дети работают?* Дети работают. Дочь и зять Русские самоцветы. *Что они делают?* Кольца, серьги. *Кем работают?* Ювелиры.

Who do you live with? Tell me about your apartment, family, what do they do?

Us-GEN five people-GEN in family-PREP. I, daughter my-NOM and son in law-NOM, granddaughter-NOM Vikka. Well Nastinka, apartment-NOM two roomed [ADj].

Children worked? Children work. Daughter and son in law-NOM Russki samotsletik *What do they do?* rings-NOM, earrings-NOM *What is their profession?* juwelleres-NOM.

Patient RUS 6

Как у вас дела сегодня? Да? Разное. Вырезал и немного готовил ужин, гулял магазин иду. Разное. *Расскажите мне о своей работе, Вы вырезали по дереву?* Резчиком и... не ... давно. *Когда?* 72 года ну паралич и скол-ко лет. Два года отдыхал и ... как сказать... заводе работал. *Какой завод?* СЕВЕР, фирма север. Дома .. ну нет.. давно... работал , получал немного, как сказать, деньги... 60 или 70 рублей.

How is your day? Yes? Various. Wood carve and a little cook supper-ACC, walk and shop-NOM go. Various…*Tell me about your work, you worked as a wood carver?* woodcarver-INST and no long time ago…*How long ago?* 72 years-GEN, well paralysis-NOM and how many years-GEN. Two years-GEN rested and how you say factory-PREP [obligatory preposition omitted] worked…*Which factory?* SEVER, company sever. Home, well no, long time ago worked, got a little, how you say, money-NOM [should be GEN as in the sense of 'some money' 60 or 70 Roubles-GEN.

Patient RUS 7

*А пляжи там какие?*___Пляжи? Пришли в одно место, приезжали сюда трамвайчики *Что там на пляже: галька, камни?*__Песочек. *Народу было много?* Нормально, как обычно. *Вы из самой Евпатории куда-то ездили на пляж?* На пляж. *Ездили на пароходике или…*_Рядом жили, ездили на берег на трамвае остановки 2-3. *Сколько же лет было будущим супругам?* 20, 19, 21 *Кому?* Наташе, Павлик.

What kind of beaches are there? beaches-NOM? Came to one place, came here trams-NOM What was on the beach? Pebbles or stones? Sand-NOM… *Many people there?* Normally as usual... *Did you go somewhere from Yevpatoria?* to the beach-ACC *traveled by boat or…?* nearby lived, went to the sea-ACC, by tram-PREP, two three stops-GEN… *How old were you?* 20, 19, 21… *Who?* Natascha-DAT, Pavlik-NOM [should be DAT].

APPENDIX II: INDIVIDUAL DATA OF THE NON-BRAIN-DAMAGED SPEAKERS

Control	*male/female*	*age*	*handed*
CRUS1	male	43	right
CRUS2	male	40	right
CRUS3	female	53	right
CRUS4	male	60	right
CRUS5	male	31	right
CRUS6	male	60	right
CRUS7	female	45	right
CRUS8	male	43	right
CRUS9	male	48	right
CRUS10	male	42	right

APPENDIX III: INDIVIDUAL DATA ON CASE MARKING PERFORMANCE IN FREE SPEECH

acc=accusative, dat=dative, ins=instrumental, gen=genitive, prep=prepositional

	+ Case assigner		- Case assigner		
patient	**correct case marking**	**incorrect case marking**	**default case marking**	**other case marking***	**specification of other case**
RUS1	17	0	12	6 (3)	ins, gen (prep)
RUS2	5	0	11	1 (0)	ins
RUS3	4	0	23	1 (1)	(prep)
RUS4	6	0	9	0 (0)	
RUS5	20	0	16	4 (1)	dat (acc)
RUS6	9	1	4	4 (2)	acc, ins (acc, prep)
RUS7	11	0	5	3 (0)	ins, dat
total	**72**	**1**	**80**	**19 (7)**	
mean	10,29	0,14	11,43	2,71 (1,00)	
SD	6,16	0,38	6,55	2,14 (1,15)	

Note: in the last column the cases that occurred without a case-assigning category are shown. All cases that are NOT in brackets occurred on DPs that could be analyzed as elliptical utterances; all cases that are in brackets could not be analyzed as DPs in elliptical utterances.

* First, the number of noun phrases without a case-assigning category is given; in brackets the number of noun phrases without a case- assigning category that could not be analyzed as elliptical utterances is given.

APPENDIX IV: INDIVIDUAL DATA REGARDING VERB PRODUCTION IN THE SENTENCE PRODUCTION TASK

patients	correct verb	incorrect verb	no verb	unanalysable utterance
RUS1	25	2	3	0
RUS2	27	3	0	0
RUS3	16	3	9	2
RUS5	28	1	1	0
RUS6	29	1	0	0
RUS7	19	8	2	1
total	**144**	**18**	**15**	**3**

APPENDIX V: THE DISTRIBUTION OF CORRECT AND INCORRECT CASE MARKINGS IN THE SENTENCE PRODUCTION TASK

Expected numbers are in **bold**. + Vfin= with finite verb**, -** Vfin= without finite verb, + V= with verb, - V= without verb.

	Subjects				**Objects**			
	+ Vfin		**- Vfin**		**+ V**		**- V**	
patients	*correct case*	*incorrect case*	*correct case*	*incorrect case*	*correct case*	*incorrect case*	*default case*	*other case*
RUS1	**27**	0	1	**0**	**27**	3	**1**	4
RUS2	**29**	0	0	**0**	**19**	10	**0**	0
RUS3	**10**	7	6	**1**	**13**	7	**8**	9
RUS5	**29**	0	1	**0**	**21**	1	**1**	0
RUS6	**30**	0	0	**0**	**32**	2	**0**	0
RUS7	**26**	1	2	**0**	**26**	6	**2**	2
total	**151**	8	10	**1**	**138**	29	**12**	15

APPENDIX VI: DPs in sentence production

patients	#noun phrases	#errors
RUS1	78	10
RUS2	75	16
RUS3	60	25
RUS5	77	7
RUS6	75	8
RUS7	69	9
total	**434**	**75**
non-brain-damaged speakers		
total	739	2

APPENDIX VII: Number of DPs produced, with number of errors produced by the agrammatic aphasic patients.

nom=nominative, acc=accusative, dat=dative, ins=instrumental.
The numbers of errors are in **bold**.

Position:	# nom	# errors with nom	# acc	# errors with acc	# dat	# errors with dat	# ins	# errors with ins
RUS1	30	**2**	28	**3**	10	**4**	10	**1**
RUS2	30	**1**	22	**2**	9	**8**	12	**5**
RUS3	26	**12**	23	**8**	8	**1**	3	**3**
RUS5	30	**0**	23	**2**	12	**1**	11	**4**
RUS6	30	**0**	25	**2**	9	**0**	10	**5**
RUS7	27	**1**	25	**5**	8	**3**	9	**0**
total	173	**16**	146	**22**	56	**17**	55	**18**

APPENDIX VIII: INDIVIDUAL SCORES ON THE DP-INSERTION TASK

nom=nominative, acc=accusative, dat=dative, ins=instrumental, SVO= single-object sentence, SVOO= double-object sentence.

patients	**nom SVO**	**acc SVO**	**dat SVO**	**acc SVOO**	**dat SVOO**	**ins SVO**
RUS1	100	95	90	100	90	95
RUS2	85	65	10	80	10	35
RUS3	75	55	80	60	50	10
RUS4	40	85	20	100	50	60
RUS5	100	75	90	100	90	85
RUS6	100	90	70	100	70	85
RUS7	90	85	60	90	40	95
mean	**84,3**	**78,6**	**60**	**90**	**57,1**	**66,4**
SD	21,7	14,4	32,7	15,3	28,7	33,0
non-brain-damaged speakers						
mean	100	100	93	100	96	97,5
SD	0	0	8,2	0	7,0	5,4